## WORLD INTELLECTUAL PROPERTY ORGANIZATION International Bureau



# INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(51) International Patent Classification 6: C12N 15/31, 15/74, C07K 14/315, A61K

(11) International Publication Number:

WO 96/40930

(43) International Publication Date:

19 December 1996 (19.12.96)

(21) International Applicati n Number:

PCT/US96/10252

A1

(22) Internati nal Filing Date:

7 June 1996 (07.06.96)

(30) Priority Data:

08/480,261

7 June 1995 (07.06.95)

US

(60) Parent Application or Grant

(63) Related by Continuation US

08/480,261 (CIP)

Filed on

7 June 1995 (07.06.95)

(71) Applicant (for all designated States except US): REGENTS OF THE UNIVERSITY OF MINNESOTA [US/US]; Mortill Hall, 100 Church Street, Southeast, Minneapolis, MN 55455 (US).

(72) Inventors; and

(75) Inventors/Applicants (for US only): SCHLIEVERT, Patrick, M. [US/US]; 5305 Birchcrest Drive, Edina, MN 55436 (US). ROGGIANI, Manuela [TT/US]; 100 Second Street Southeast, #803, Minneapolis, MN 55414 (US). STOEHR, Jennifer [US/US]; 3981 Woodridge Circle, Vadnais Heights, MN 55127 (US). OHLENDORF, Douglas [US/US]; 9397 Olympia Drive, Eden Prairie, MN 55347 (US). (74) Agent: BRUESS, Steven, C.; Merchant, Gould, Smith, Edell, Welter & Schmidt, P.A., 3100 Norwest Center, 90 South Seventh Street, Minneapolis, MN 55402 (US).

(81) Designated States: AL, AM, AT, AU, AZ, BB, BG, BR, BY, CA, CH, CN, CZ, DE, DK, EE, ES, FI, GB, GE, HU, IL, IS, JP, KE, KG, KP, KR, KZ, LK, LR, LS, LT, LU, LV, MD, MG, MK, MN, MW, MX, NO, NZ, PL, PT, RO, RU, SD, SE, SG, SI, SK, TJ, TM, TR, TT, UA, UG, US, UZ, VN, ARIPO patent (KE, LS, MW, SD, SZ, UG), Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European patent (AT, BE, CH, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, ML, MR, NE, SN, TD, TG).

### **Published**

With international search report.

Before the expiration of the time limit for amending the claims and to be republished in the event of the receipt of amendments.

(54) Title: MUTANTS OF STREPTOCOCCAL TOXIN A AND METHODS OF USE

## (57) Abstract

This invention is directed to mutant SPE-A toxins or fragments thereof, vaccine and pharmaceutical compositions, and methods of using the vaccine and pharmaceutical compositions. The preferred SPE-A toxin has at least one amino acid change and is substantially non-lethal compared with the wild type SPE-A toxin. The mutant SPE-A toxins can form vaccine compositions useful to protect animals against the biological activities of wild type SPE-A toxin.